

Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.



Reame

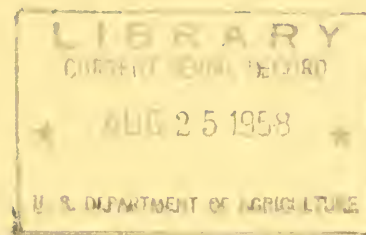
ARS-23-8-11

A31.3

R31Ae

* - *

FEDERAL-GRANT RESEARCH
at the
STATE AGRICULTURAL
EXPERIMENT STATIONS



Projects on
FORESTRY
Part 11

Agricultural Research Service
UNITED STATES DEPARTMENT OF AGRICULTURE

Compiled February 1958 by

the State Experiment Stations Division, Agricultural Research Service, U. S. Department of Agriculture, Washington 25, D. C., for use of workers in agricultural research in the subject-matter areas presented. For information on specific research projects write to the Director of the Station where the research is being conducted.

Issued July 1958

FEDERAL-GRANT RESEARCH
at the
STATE AGRICULTURAL EXPERIMENT STATIONS

Projects on

FORESTRY

Contents

	Page
I. FORESTRY	
A. General	1
B. Genetics and Breeding	3
C. Establishment	6
D. Management	9
E. Disease Control	22
F. Insect Control	26
G. Lumbering	29
H. Economics and Marketing	30
I. Utilization	36
II. REGIONAL RESEARCH, INCLUDING STATES WITH CONTRIBUTING PROJECTS	41
III. LIST OF SUBJECT-MATTER AREA COMPILATIONS	Attachment

INTRODUCTION

This compilation is one of a series providing information on State agricultural experiment station research supported by Federal-grant funds appropriated annually by Congress under authorization of the Hatch Act of 1887, as amended and approved Aug. 11, 1955, and Section 204(b) of the Agricultural Marketing Act of 1946. It is prepared for use by research workers in the subject-matter areas presented. Only that part of each State's research program supported by Federal-grant moneys is included.

In addition to the Federal-grant moneys, the State experiment stations receive some Federal support through cooperative agreements or contracts with the U. S. Department of Agriculture. Information on such research, along with other departmental research, is available in the Central Project Office, Agricultural Research Service.

A substantial part of each State agricultural experiment station's research is supported with moneys appropriated by the respective State or Territorial Legislatures and through other forms of private and public financing. Information on current agricultural research at the stations which is not financed under the Federal-grant program or through USDA cooperation can be obtained from experiment station directors.

The information given in the series of Federal-grant compilations includes the title and objectives of each Federal-grant project pertaining to the subject given on the cover. The identification of each project gives the department(s) conducting the research, the station number of the project, and the number of the regional project if it is a contributing project.

Relevant regional projects, if any, appear at the end of the compilation. States having projects contributing to regional projects are indicated. The Roman numeral (and capital letter) refer to the location in the summary of the contributing project title and objectives. The States are grouped into four major regions. These are designated NC-North Central, NE-Northeastern, S-Southern, and W-Western. The capital letter "M" following the letters for the region indicates regional marketing projects.



FORESTRY

General

Minn.

Studies on the Improvement of Minnesota Forest and Shade Trees. To (1) improve naturally regenerated stands through establishment of guides to the recognition of superior parents for seed production; (2) develop means of producing cheaper and more abundant sources of seed of superior strains; (3) develop information on seed sources and/or produce hybrids giving promise of providing superior planted stands that may a. grow more rapidly, b. produce better wood quality including such items as smaller knots, longer fibers, higher density, desirable sap-wood-heartwood ratio, less taper, and shorter crowns, c. have better form for such purposes as sawlogs, piling and poles, Christmas trees, and windbreaks, d. show resistance to insects or disease, e. show resistance to drought or winter injury, f. possess desirable cone-opening characteristics, and g. produce higher yields of maple sugar; and, (4) test introduced species and hybrids.

For. 1913

Minn.

The On-Farm Market for Farm-Produced Wood Chips for Livestock Bedding. (1) Learn demand for chips for use as bedding. (2) Assess possibility of actualizing potential demand for chips by learning if: presently-used bedding materials are in short supply due to diversion to other uses, as trench silage; diversion of productive resources from bedding-producing crops to other crops; increase in animal population; there is dissatisfaction on part of farmers with qualities of bedding; farmers think present bedding supplies are inadequate; they would like to replace this with other types; bedding qualities farmers consider most important; cost of current bedding; if farm is equipped to handle, dry, and store chips. (3) On basis of findings make recommendations for or against large scale research on production and use of chips on farm.

For. 1920 (NCM-17)

Mo.

Effect of Forest Cover on Soil and Water Resources. (1) Hydrologic orientation: obtain, analyze, and interpret existing hydro-meteorological records to provide a sound basis for initiating and interpreting later, long-time studies on small drainage areas; (2) Soil moisture studies: learn effect of timber cutting and surface soil condition on soil moisture, including observations of water table in shallow wells, interception of precipitation by trees and litter, evaporation, and transpiration, all of which are variables in hydrologic equation; (3) Small watershed studies: determine influence of forest land-management practices on quality, quantity, and timing of runoff from paired experimental drainage areas including a. regimen of streamflow from undisturbed forest areas during initial standardization period of several years, b. effect of abusive watershed practices, c. effect of restorative watershed practices.

For. 158

- Mo. The Effect of Soil and Parent Material on Distributions of Native Ozark Timber Species. To determine (1) relationship of loess distribution to occurrence of shortleaf pine and post oak; (2) relationship of geologic parent material to shortleaf pine distribution; (3) shortleaf pine as an early phase of old field succession on residual soils derived from granites and porphyries; and, (4) geologic interpretation of Clarkesville Soil Series with reference to residuum and stratigraphy of the Roubidoux and Gasconade formations as they are related to forest types.
For. 260 Coop. FS
- S. Dak. Selection of Adapted Species and Strains of Trees and Shrubs for South Dakota Farms. (1) Learn adaptability and growth of various species, strains, and varieties of trees and shrubs in State. (2) Develop improved types through tree breeding and perfect methods of propagating. (3) Learn more effective windbreak designs for better use of improved trees and shrubs.
Hort., For. 142
- Tex. Private Forest Land Ownership in Commercial Forest Areas of East Texas. To (1) determine ownership patterns of privately owned forest land in selected areas of east Texas; (2) determine management practices by ownership classes; (3) analyze relationships between ownership classes and management practices, and why those practices are followed; (4) show complementary nature of forest management and use of land for crops and livestock in east Texas; and, (5) interpret results in terms of needs for more widespread application of forestry practices so that public agencies may organize and carry out comprehensive program of forest management education.
Agr. Econ., Sociol. 953
- W. Va. Production of Plantation-Grown Trees in West Virginia.
Learn: (1) best time for pruning Christmas species in different portions of State; (2) species and races of desirable species, best suited to different sites; (3) methods of weed control prior to, and after establishment of trees; (4) effect of fertilizers on growth and color of trees; and, (5) economic factors in production and marketing.
For. 119
- Wyo. A Chemical Study of Pinus Ponderosa Needles in Relation to Poisoning of Cattle. (1) Learn by experiment if rabbits or guinea pigs can be used for assay purposes. (2) Make fractionation and chemical study of pine needles. (3) Make characterization of pine needle volatile oils and lipids.
Agr. Res. Chem. 643

Genetics and Breeding

- Ala. Physiological Characteristics of the Progeny of Selected Southern Pines and Their Interrelation with Nursery Practices, Survival, and Early Growth. To determine (1) certain genetic characteristics in progeny of superior, average, and inferior phenotypes through chemical studies of mineral uptake and carbohydrate food reserves; and, (2) relationships between initial survival and early growth of out-planted seedlings and inherited physiological characteristics as modified by environment in the seedbed.
For. 551 (S-23)
- Conn. Biochemical Processes Underlying Growth Regulation in Eastern Hemlock (*Tsuga Canadensis*). To explore biochemical processes explaining effects of light and temperature on annual growth cycle of eastern hemlock; breaking of seed or bud dormancy, terminal and lateral stem elongation, and return to dormancy.
For. 420
- Ga. Production of Useful Mutants in Loblolly Pine by Irradiation. To (1) explore possibilities of developing more productive strains of loblolly pine (*Pinus taeda* L.) from mutants artificially induced by gamma and neutron irradiation of seed and seedlings.
For. 112 Coop. AEC, Oakridge National Lab.
- Ga. An Analysis of Certain Cytological and Anatomical Features of Phenotypic Variants, Races and Hybrids of Southern Pine Species Which May Aid in Selection of Breeding Stock. To (1) determine reliability of certain anatomical features of phenotypic variants of each species in wild stands as criteria in selection and breeding superior trees; (2) compare anatomical characteristics of selected parent trees of each species with those of their progeny; and, (3) determine chromosome numbers of phenotypic variants, races and hybrids of each species.
For. 326 (S-23) Coop. FS
- Ga. Tree Breeding and Genetics. (1) To understand and delineate morphological, anatomical, and physiological characteristics of trees so that value is recognized in a breeding program. (2) Maintain a breeding program to produce high yielding and high quality trees. (3) Study heredity of characters in trees and physical bases of their inheritance.
For. 327 (S-23) Coop. FS

- Maine Forest Tree Improvement by Selection of Species or Races.
(1) Select races of forest trees with rapid growth, improved form, and high wood quality. (2) Locate seed sources of superior forest tree species or races.
For. 91 (NE-27)
- Md. Forest Tree Improvement by Chromosome Doubling of Haploid Sporophytes. (1) Learn percentage of various types of spontaneously occurring multiple seedlings and chromosome numbers thereof. (2) Isolate haploid members of multiple seedlings and establish homozygous lines by doubling their chromosome number with colchicine for ultimate utilization as parents in the production of F₁ hybrids.
Bot. F-17 (NE-27) Coop. FS
- Mass. Effects of Antibiotics and Organic Fungicides, Especially the Newer, on the Survival, Rooting, and Subsequent Growth of Cuttings of Nursery Stock and of Eastern White Pine. Learn how best to use antibiotics and organic fungicides, especially new organic fungicides, for treatment of cuttings of nursery stock, i.e., trees and shrubs, and Eastern white pine, so as to increase survival and improve rooting of cuttings.
Bot. 19
- Mass. Ecological Succession on Abandoned Farmlands in Massachusetts. To study vegetational changes on abandoned farmlands in central Massachusetts for (1) ascertaining the stages of plant succession on woodland pastures, abandoned orchards and land previously under cultivation; (2) learning the pattern and rate of vegetational change associated with the various degrees of these cultural uses; and, (3) correlating effect of land use and other environmental disturbances, and edaphic and climatic factors with the development of forest vegetation within a single physiographic region.
For. 77
- Minn. A Study of the Effect of the Source of Seed Upon the Growth, Development, and Habits of Native Tree Species. --
A. A Study of the Effect of Source of Seed and the Influence of Insects upon the Growth, Development, and Habits of Jack Pine (Pinus Banksiana Lamb.). To study (1) effect of climatic conditions upon growth, development and hardiness of jack pine from various portions of its range; (2) effect of form of parent tree upon the progeny; (3) variations in seed value from different portions of tree's range; (4) whether the characteristics of opening cones annually on trees is inherited; and, (5) influence of insects, such as tip moth, pitch nodule makers, sawfly, midges and others, on form and development of tree and determine methods of control.
For. 1902

- N. H. Stimulation of Seed Production of White Pine (Pinus Strobus L.). To learn (1) possible effectiveness of treatment for increasing seed production; (2) relative effectiveness of several treatments for increasing seed production; (3) level of fruitfulness reflected in number of cones produced before and following treatment of trees classified as to diameter and crown class within age groups; (4) amount and quality of seed produced by trees classified according to age, diameter, and crown class within treatments; (5) if differences exist between treatment groups in flowering, cone ripening, and cone opening; and, (6) loss of seed from tree due to insects and mammals.
For., Agron. 110 (NE-27)
- N. J. Germination and Planting Tests of Selected Ecotypes of Known Provenance of Scotch Pine and Untested Species of Spruce and Fir. To grow (1) Scotch pine seedling stock from native and European stands in the determination of superior strains for Christmas trees; (2) seedling stock of untested species of spruce and fir from selected seed of known origin in the determination of superior species for Christmas trees.
For. 305 (NE-27)
- N. C. Selection and Testing of Certain Pine Species for Desirable Qualities. (1) Locate and catalog desirable selections from wild populations and existing populations. (2) Vegetatively propagate such selections. (3) Progeny-test selections using open-pollinated seed. (4) Progeny-test selections using control-pollinated seed.
For. 70 (S-23)
- Pa. Development of Superior Scotch Pine and Douglas Fir Forest Trees for Use as Christmas Trees. (1) Develop superior natural seed production areas for Scotch pine and Douglas fir for use in the Northeastern United States. (2) Establish regional seed orchards from seedlings of superior races and varieties of the two in the major climatic zones of the Northeastern United States.
For. 1302 (NE-27)
- Tenn. A Study of Forest Tree Species Adapted to the Cumberland Mountain Area of Tennessee. To (1) determine best adapted species for several soil and physiographic forest sites in Cumberland Mountain area; and, (2) investigate best adapted species to plant on strip-mine coal lands.
For. 103
- Tenn. Forest Tree Improvement. Improve certain commercially important tree species in managed forests of State by means of tree selection and breeding.
For. 106 (S-23) Coop. FS

Tex. Improvement of Certain Characteristics of Growth, Form and Wood Qualities of the Southern Pines by the Application of Genetic Principles, with Emphasis on Loblolly Pine. To (1) develop a. strains of drought and heat hardy pine, b. methods of vegetative propagation from mature trees, especially loblolly pine, for use in genetic tests; (2) determine a. role of genetics and environment in producing wood of high and low specific gravity, b. methods best suited for mass production of seed of improved strains and hybrids of southern pines, c. best methods of collection, extraction, storage and testing of pine pollen, d. value and genetic character of outstanding nursery seedlings; (3) locate and test superior phenotypes to see if they are genotypically superior; and, (4) test geographic strains of major southern pine species.
Genet. 1009 (S-23)

Wis. Poplar Diseases and Disease Resistance. (1) Study resistance to diseases and insects, rooting ability, growth rate, tree type, wood quality and adaptability of poplars to State conditions. (2) Clarify etiology, epidemiology, and economic importance of each disease and particularly of stem cankers.
Pl. Path. 1026

Establishment

La. Effects of Geographic Source of Seed on Planted Loblolly Pine. (1) Discover if, in a given planting locality, lots of stock grown from seed of different geographic sources vary genetically from one another in survival, growth rate, tree form, wood quality, resistance to destroying agencies, or any other characteristics. (2) Discover if stock from seed collected in a given locality in the state can be safely planted elsewhere in state without reduction in yield. (3) Delineate safe zones of seed collection and use.
For. 923 (S-23)

Mass. Natural Regeneration of Eastern White Pine from Seed. To develop better techniques for reproducing stands of eastern white pine through control of cutting and the treatment of seedbeds.
Bot., For. 76

Mass. Artificial Regeneration of Eastern White Pine and Other Conifers by Direct Seeding. Learn practicability of substituting direct seeding for forest planting of nursery-grown stock in supplementing natural regeneration of eastern white pine and other conifers in New England.
For. and Wildlife 136 Coop. USDI, Fish and Wildlife Serv.

- Mo. Ecological Studies in Forestry. -- a. Acorn Production.
To secure data on more species, a greater number of trees of each species, and expand the work to cover additional areas.
For. 123-a
- Mo. Techniques for Improving the Results of Forestation.
(1) Conduct species adaptability studies under range of site conditions commonly found on denuded or poorly stocked lands. Investigate (2) ecological and genetical factors as fundamental considerations in selection and production of suitable tree seed; (3) nursery practices as factors influencing survival and vigor in forest plantations; (4) various methods of site preparation and planting practices; (5) importance of spacing of trees; control subsequent to planting of competition from herbaceous and/or woody vegetation; mulching; fertilization; protection from disease, insects, domestic stock, and wildlife.
For. 157
- Nebr. Effect of Interrupted Dark Period on Seedling Growth of Three Conifers. (1) Learn vegetative growth response of Pinus ponderosa, P. nigra, and Juniperus virginiana seedlings when grown under conditions of: 14 hour day-length with dark periods interrupted by light periods while growing under controlled indoor temperature; normal growing season day-length with dark period interrupted by light while growing in "out-of-door" environment. (2) Learn cumulative effect of growing same seedling through two or more seasons of similar treatment. (3) Compare under field conditions first year survival and growth of planting stock produced by these methods with ordinary nursery stock.
For. 526 Coop. FS
- Nebr. Response of Trees to Certain Commercial Fertilizers Applied at Time of Planting. Learn effects of application of following on survival and growth of newly planted seedling trees on a wide variety of sites: NH_4NO_3 ; concentrated superphosphate; muriate of potash; mixture of NH_4NO_3 and concentrated superphosphate; mixture of NH_4NO_3 , concentrated superphosphate, and muriate of potash.
Hort., Agron. 571 Coop. SCS
- K. H. Site Preparation for Reproduction of Eastern White Pine.
To learn (1) effectiveness of site preparation in germination and establishment of white pine as compared with no site preparation; (2) relative effectiveness of a number of site preparation methods; (3) proportion of white pine seed lost to birds and rodents under unprotected conditions; (4) micro-climate differences existing under various site preparation treatments involved in study.
For., Agron. 104

N. C.

Drainage, Site Preparation, and Site Improvement in Relation to Reforestation of Pocosin Lands. Learn (1) if furrows made by 2-disc Mathis fire plow will provide sufficient drainage on lands to prevent accumulation of surface waters when furrows are spaced to serve as site preparation measures prior to planting; (2) distance from main canals to which furrows provide sufficient drainage to be reflected in acceptable growth of seedlings into merchantable products, and learn cost of furrowing; (3) if location in furrow, on berm, or just outside berm, provides best site for setting out seedlings; (4) Compare survival and growth performance of several appropriate species; and, (5) By pot culture and in situ tests learn if additions of minerals, lime, N, and minor elements will increase seedling growth.

For. 138

Utah

Development, Morphology and Mineralogy of Range and Forest Soils. (1) Make detailed chemical, physical, and mineralogical studies of genetic horizons of some representative profiles. (2) Study interrelation of climate, parent material, and soil profile development. (3) Learn proportions and types of clays present. (4) Study conditions and effects of vegetative succession as related to changes in soil profile.

Agron. 489 Coop. SCS

Wash.

Mechanical Planting as a Means of Artificial Regeneration on Eastern Washington Denuded Forest Areas. Study machine planting of forest trees in Eastern Washington denuded areas.

For. 1338

W. Va.

Animal Repellents on Hardwood Forest Plantations. To determine (1) extent of wild animal injury to hardwood forest plantations on spoil banks and in other locations; (2) extent of protection given by chemical repellents; (3) optimum time and frequency of application of repellents; and, (4) cost of application of repellents on hardwood plantations of young trees.

For. 37

W. Va.

Factors Affecting Natural Regeneration in Upland Oak Types. To (1) test various types of reproduction cuttings in evenaged and unevenaged upland oak stands on various sites, in order to determine which methods of cutting are most applicable to obtaining oak regeneration in these forest types; (2) determine most important species of harmful and beneficial insects affecting natural regeneration of upland oaks, and ascertain nature of some of their ecological relationships to the forest; and, (3) determine effect and relative importance of rodents and animals other than insects, depth of litter, and compactness of surface soil on viability and germination of acorns.

For., Pl. Path. 67

- W. Va. Studies of Soil Properties that Affect Establishment and Growth of Oak Stands in West Virginia. (1) Study effect of soil properties on site quality of oak stands and on their reproductive capacity. (2) Test application of site-growth relationships found for oak species to other tree species on same soil mapping units. (3) Prepare detailed woodland site capability classification based on existing soil mapping units or on refinements of latter.
Agron., Genet. 117
- W. Va. Revegetating Spoil Banks with Forest Tree Species.
(1) Evaluate success of past direct seeding of black locust on spoil banks in State. (2) Learn specific factors affecting germination and survival of black locust on spoil banks. (3) Find effective means of seeding forest tree species on State spoil banks. (4) Learn survival and growth of various tree species planted on spoil banks.
For. 120 Coop. SCS
- Management
- Ala. Effect of Various Forest Situations and Practices on the Growth and Value of Forest Products and Returns from Forest Lands in Alabama. To (1) investigate factors that affect establishment, development, composition, and growth of forest stands and yield of products; (2) improve tree quality and rate of growth by selecting and developing superior seed sources; (3) develop improved methods of forest protection against fire, disease and insect attacks; and, (4) evaluate economic aspects and applying accepted and new forest practices.
For. 411
- Ala. The Establishment, Growth and Yield of Forest Plantations in Alabama. To determine effect of certain site factors, especially soil, on the establishment, growth and yield of commercial tree species already planted and to develop specifications and instructions for planting such species under the site conditions existing in the State.
For. 509
- Ark. Studies in the Economy and Application of Silvicultural Practices. To (1) determine practices suitable for regeneration of farm forests and timber stands; (2) study factors affecting survival, vigor and growth of forests; and, (3) study forest land use factors affecting farm forests.
Hort., For. 216

- Calif. The Effects of Fluorides on Growth, Quality, and Yields of Tree, Field and Vegetable Crops. (1) Learn phytotoxic effects of atmospheric fluorides on nutrition, growth, and, when possible, yields of important crops. (2) Investigate effects of the incorporation of soluble fluorides with various types of soils on the growth and fluoride uptake by plants grown thereon. (3) Learn effects of prolonged irrigation of crops on acid, neutral and alkaline soil with water containing soluble fluorides.
Soils and Pl. Nutr., Air Pollution 1633B (W-39)
- Conn. Forest Succession on Abandoned Agricultural Lands and Farm Woodlots. Investigate succession in relation to climatic life zones, to varying soils and topographic features within each zone and to disturbance history regardless of type or location.
For. 422.
- Ga. Effect of Stand Density upon Growth, Mortality, and Economic Returns from Sapling Loblolly Pine Stands. Investigate (1) reduction of sapling pine stands in order to establish density for optimum growth; (2) economics of thinning sapling stands.
For., Agr. Econ. 78
- Ill. The Establishment, Culture, and Development of Forest Plantations in Central and Northern Illinois. To determine (1) tree species best adapted to forest planting; (2) best methods to establish plantations on various sites and their costs; (3) growth rates of plantations; and, (4) best cultural practices in weeding, pruning, and thinning plantations.
For. 55-301
- Ill. The Volume, Growth and Yield of Important Farm Forest Timber Types in Central and Northern Illinois. To determine (1) timber resources of Illinois; (2) best cultural practices for important forest types; and, (3) current growth rates and growth potentials of important forest types.
For. 55-302
- Ill. Forest Nursery Soil Management. (1) Improve quality of planting stock produced in State Forest Tree Nurseries by developing better techniques of nursery soil management. (2) Learn what soil or management deficiencies limit quality of stock now being produced.
For. 55-320

- Ill. Growth and Development of Native Hardwood Stands and Pine Plantations as Related to Certain Environmental and Site Conditions. To (1) work out site index curves for both hardwood and pine on basis of site factors; (2) establish timber productivity classes for important soil types or series; (3) study growth of various species in relation to factors that effect availability of soil moisture; and, (4) investigate relation between site and mineral content of foliage of both pine and hardwood species.
For. 55-341
- Ind. Woodland Management on the Southern Indiana Forage Farm. To (1) determine growth of residual stand and response in regeneration, following logging; (2) regulate and improve volume and quality of growing stock; and, (3) devise and use method for keeping adequate production and marketing records for forest products.
For. and Conserv. 691
- Ind. Silvicultural Management of Indiana Farmwoods. (1) Learn effects of intensity of cutting on natural regeneration of farmwoods timber. (2) Relate silvicultural and economic aspects concerned with various intensities of cutting of timber. (3) Apply sound forest management principles to Station and university owned woodlands and those of cooperating owners for purposes of experimentation, demonstration, and use.
For. and Conserv. 699
- Ind. Fertilization of Christmas Trees. To determine effects of fertilization on Christmas tree foliage color.
For. and Conserv., Agron., Hort. 757
- Ind. The Relation of Soil Fertility Level to the Growth of Forest Trees. To learn (1) effect of various levels of N and P on tree growth in upland-hardwood stands situated in the sandstone-shale area of southern Indiana; (2) if forest productivity potentials can be estimated using the Purdue Quick Tests.
For., Agron. 887
- Kans. The Effect of Different Spacing on Survival and Growth in Forest Plantings. (1) Ecological study of shelterbelts planted in Kansas by Prairie States Forestry Project and other agencies. (2) Effect of different spacing distances on survival and growth of tree plantings. (3) Forestation studies of spoil banks in southeastern Kansas.
Hort. 433 Coop. FS, SCS

Ky. Economic Appraisal of Farm Woodland in the Eastern Pennyroyal Area of Kentucky with Particular Reference to Comparative Values and Yields Contingent on Site and Stand Quality. To determine the desirability and profitability of adapting long-run management plans to various types of forest growth and site qualities.
Agr. Econ. 27

Maine Management of Small Woodland Areas in Maine. (1) On small woodland holdings (including farm woodlots), obtain following data: production for several years; dollar expenditures or man days per acre, and net profit if possible; cost of roads, etc.; percent of work done by owner, his family, hired help; use of farm animals and equipment, and dollar return; type of efficiency of equipment; yearly man days in woods, income compared to net returns on other crops; material from woodlot used for fuel, fencing, repairs, etc.; learn importance of taxes (if amount can be separated from total farm tax). (2) Make specific recommendations for managing small wooded areas.
For. 1 Coop. SCS, FS

Maine Increased Production of Northern White Pine in Maine.
To increase the production of white pine in the State and thereby to increase the income from farm woodlands.
For. 16

Mass. The Culture of Coniferous Nursery Stock in Massachusetts.
To (1) learn equipment, materials, and techniques of culture used in present-day forest nursery practice throughout the United States; (2) determine value of new materials (particularly herbicides) to production of forest nursery stock; and, (3) investigate root-shoot ratios as they are influenced by spacing, fertilization, moisture and light.
For. 72

Mass. Forest Stand Improvement by the Use of Chemicals to Kill Inferior Trees. To test use of various chemicals to kill weed trees in Massachusetts forests.
For. 73

Mass. Growth and Yield of Managed Forests. To study by means of permanent test plots the growth and yield of managed forests in Massachusetts.
For. 75

Mass. Influence of Soil Conditions on the Growth of Forest Stands: Part I - Red Pine. Evaluate the suitability and productivity of soil-sites for the growth of various tree species.
For. and Wildlife 78 (NE-27)

Minn.

The Effect of Forestry Practices on Ruffed Grouse Population. To (1) determine ruffed grouse populations and the environmental factors affecting them; (2) learn grouse movements and their use of various forest coverts; and, (3) relate these two objectives to forestry practices.
Ent., Zool. 1732

Minn.

Management of Southern Minnesota Hardwoods. To (1) learn the growing stock level which will give maximum production of quality, quantity, and value; (2) learn if even-aged or all-aged management is better in these stands; (3) learn what level of production can be expected under intensive management compared with present types of management; and, (4) discover how the quality of Minnesota hardwoods compares with that of hardwoods from other areas.
For. 1915

Minn.

Tree Species Adaptability and Growth on Southern Minnesota Farm Lands. (1) Establish site quality guides for tree planting in southern Minnesota; (2) Learn species and biotypes best adapted; (3) Devise planting stock quality guides and methods for securing required quality; (4) Study planting methods with reference to their influence on subsequent survival and growth; and, (5) Test introduced species and learn their suitability and desirability for southern Minnesota planting.
For. 1917 Coop. SCS

Minn.

Ecology and Control of Brush and Other Forest Vegetation. (1) Study life history and successional ecology of major brush species basic to development of control measures. (2) Develop techniques for controlling forest vegetation leading to desired management goals for forestry, wildlife, or agricultural purposes. (3) Predict trends in forest succession as an aid in planning use of forest and wildlife resources.
For. 1918 Coop. USDI

Minn.

The Effect of Soil Properties on the Regeneration and Growth of Important Tree Species. To determine effect various soil properties have upon natural regeneration and rate of growth of principal commercial species of trees in Minnesota, such as jack pine, white pine, Norway pine, and quaking aspen.
Soils, For. 2518

Miss.

Development of Improved Management Methods for Hardwood and Pine-Hardwood Stands. Find answers to: thinning in even aged bottomland sweetgum stands; (2) relation of stand and site conditions to grub and ant damage in green ash stems; (3) ability of loblolly pine seedlings and small saplings on upland sites to overtop various density and species combinations of hardwood stems, saplings and smaller, of seedling and sprout origin; (4) study methods for relating stand characteristics to average stand form class; and, (5) biological development of upland flatwoods pine stands maintained at three levels of stocking, with an economic appraisal.

For. HI-2

Mo.

Christmas Tree Culture. To (1) continue selection and development of Christmas tree planting stocks; (2) continue records on site-adaptability studies with various species established between 1950 and 1951; (3) continue records on site-preparation study with jack pine started in 1950; (4) continue treatments and records on spacing-cultivation study with Scotch pine; (5) continue records and maintenance of planting method and mulching study with Scotch pine and eastern white pine; (6) continue seedling grade study started at Ashland in 1953 using 2-0 Riga Scotch pine, 2-1 Scotch pine, 2-0 jack pine, and 1-0 jack pine; (7) continue pine tip moth control study; (8) observe, particularly in fall and winter, effectiveness on deer movement of three kinds of fencing erected in 1953 and early 1954; (9) continue measure of cumulative effects of deer and tip moth damage on Christmas tree yields of Scotch and jack pines; (10) continue pruning and shearing study of jack pine and Scotch pine for improvement of Christmas tree quality; and, (11) study effects of mineral nutrients in various combinations on seasonal color of Scotch and jack pines.

For. 9 Coop. FS

Mo.

Improvement of Low-Quality Understocked Hardwood Stands. To determine factors affecting establishment, growth, and development of commercially important trees in natural forest plantations.

For. 75

Mo.

Fire Studies. Work will consist entirely of maintenance work and maintenance of records on plots previously established.

For. 75-C

- Mo. Pruning of Oaks. Pruning study begun by Forest Service in 1937 will be investigated. Original pruned plots will be re-established in ground, growth data taken and sample trees dissected. Photographs will be taken from camera points established and dissected stems photographed. Another addition to present pruning study is planned which will vary slightly from original working plan. Two 2-acre plots will be established in which scarlet oak predominates. Crop trees will be selected and one-half of each plot will be pruned to 17 feet with pole saw. Cost and growth data will be kept according to working plan and camera points established.
For. 75-E
- Mo. Conversion of Low-Value Hardwood Stands to Conifers. To test the practicality of converting a blackjack-post oak ridge to various species of conifers, involving felling, girdling, and poisoning existing trees both before and after planting and seeding the conifers.
For. 75-G
- Mo. Reproduction and Forest Stand Improvement Cuttings. To (a) revise literature, review manuscript and establish additional study plots in young natural stands at the Weldon Spring Experimental Farm and take first-year measurements after the 1953 growing season, and re-measure experimental plots on DuPont State Forest after 1953 growing season; (b) study stand diameter growth in a mixed oak stand which has been partially cut and also amount of reproduction and changes in species composition which develops in partially cut oak stands; (c) provide a means for harvesting the timber crop of the Weldon Spring Experimental Farm in order to meet the cutting needs as prescribed for experimental units and secure greatest economic return of resource through selective marketing practices; (d) establish a series of 12 experimental plots, apply to them different stand improvement treatments, and secure and record all basic data needed as a foundation for this study; and, (e) establish a set of plots on University Forest with possibly another set at Weldon Spring Farm, and cooperate with personnel of Popular Bluff Ranger District and National Distillers Products Corporation in establishing by them of a set of plots on their respective land.
For. 122 Coop. FS
- Mo. Ecological Studies in Forestry. A. Acorn production.
B. Forest succession of the bottomland hardwoods in southeastern Missouri. D. Effects of forest grazing.
For. 123

- Mo. Ecological Studies in Forestry.--b. Forest Succession of the Bottomland Hardwoods in Southeastern Missouri. To (1) survey successional time sequence of bottomland hardwood types in the large bottoms of Mississippi, St. Francis, and Black Rivers, with the hope of developing a sampling technique that will permit recording data on punch cards; and, (2) establish permanent plots in Mingo Wildlife Refuge from which information on marsh-forest transitions can be evaluated.
For. 123-B
- Mo. Ecological Studies in Forestry.--d. Effects of Forest Grazing. To make annual re-measurements of original 20 grazed and ungrazed plots at Weldon Spring in Stands 23 and 19.
For. 123-D
- Mo. Control of Undesirable Trees in Timber Stand Improvement. Find most effective and economical method of eliminating low-value trees from timber stands and prevent or minimize their regeneration by sprouting.
For. 166 Coop. USDA
- Mo. Effect of Stand Treatment on Growth, Seed Production, and Regeneration of Bottomland Hardwoods. (1) Learn effect of cutting methods and semi-controlled periodic flooding on growth, seed production, and regeneration of bottomland hardwood species; (2) Learn silvical characteristics and requirements of bottomland hardwoods; (3) Investigate forest succession of bottomland hardwoods in southeastern Missouri as a means of interpretation of regeneration responses; and, (4) Develop tree classes for commercially important species.
For. 287 Coop. USDI and FS
- Mo. Use of Forced Air in Forest Fire Control. Develop a new type of fire fighting equipment, using forced air to move leaves and litter in building fire line.
For. 290
- Nebr. Study of Silvicultural Practices in Hardwood Woodlots of Nebraska. To study and develop methods of: obtaining desirable natural reproduction, obtaining reproduction by seeding and planting, weeding out undesirable trees by removing, poisoning, or girdling; (2) Study changes in composition and quality of Nebraska hardwood forests due to these practices; and, (3) Provide foundation for study of economic aspects of woodland management in state by accounting of income and expenses.
For. 519

- N. H. Propagation of Woody Plants. To study factors affecting rooting, survival, and continued growth of cuttings of woody plants including Acer, Rubus, Corylus, Malus, and Syringa.
Bot., Hort. 44
- N. H. The Relationship of the Growth of White Pine in New Hampshire to Selected Environmental Characteristics. To determine variations in pattern of height and diameter growth of white pine as related to site, with particular reference to climatic, physiographic and biotic factors of the environment.
For., Agron. 70
- N. J. Investigations of Christmas Tree Growing in New Jersey. To test, under New Jersey conditions, suitability of various species of conifers, and for each species, problems of spacing, rate of growth, length of rotation, need for and cost of shaping, possibility of reproducing from lowest whorl of branches and desirability of this method.
For. 301
- N. J. Investigations in New Jersey Farm Woodlot Silviculture. To study how to (1) develop and maintain a woodlot margin which at the same time provides minimum competition for adjacent fields and produces well-formed trees; (2) diversify species of the woodlot as a precaution against epidemic diseases and insects and the markets as a means of increasing income; and, (3) make an annual harvest in a small woods of species which are usually thought of as needing conditions of an even-aged stand.
For. 303
- N. Y. Tree Plantations. To (1) determine best species to be (Cornell) grown on heavy upland soils; (2) investigate wide spacing of coniferous species, which may lead to large savings in plantation growing; (3) investigate fall planting so that heavy spring work may not prevent planting; and, (4) investigate several unhealthy plantations of red pine which may be due to poor soil drainage.
Agron., Conserv. 81-A Coop. SCS
- N. Y. Windbreaks for Muck Land at Elba, New York. To determine (Cornell) if the presently used willow, Salix purpurea, can be successfully grown for windbreaks, when properly managed and disease free stock is used, and if the attempt is not successful, to find a substitute.
Ent., Pl. P., Conserv. 81-C Coop. SCS

N. Y. Woody Brush Control. To determine the best methods of
(Cornell) application, volumes and concentrations to use, and effect
of dormant treatment in brush poisoning with the selective,
hormone weed killers.

Conserv. 81-E

N. Y. Improvement of Trees for Farm Forest Plantations. To
(Cornell) learn (1) soil and climatic requirements for optimum growth
of commonly used plantation species of similar seed origin
and extent to which deviations from the optimum limit growth;
(2) degree to which known geographic races maintain or exhibit
desired characteristics through range of soil and climatic
conditions; (3) select from state forest plantations those
stands or individuals which are outstanding in characteristics
for use, or in adaptability to soil and climate, as Christmas
trees.

Conserv. 182 (NE-27)

N. C. Relative Productivity of Lower Piedmont Forest Land for
Pines or Hardwoods. Learn (1) what site qualities are essential
for satisfactory growth and development of pines as against
hardwood species in natural stands; (2) by plantations, separate-
ly and in combinations of mixtures, which species produce most
acceptable growth on variety of sites found in lower Piedmont.
And, (3) Fertilize unsatisfactorily developing sites.

For. 139

N. C. Plantation Management. Learn (1) optimum spacing for the
several plantable species in lower Piedmont and Coastal Plain;
(2) schedule and intensity of thinnings and prunings in planta-
tions, emphasizing degree of thinning in relation to site
quality and initial spacing; (3) develop plantation yield
tables and learn culmination point of mean annual growth in
relation to site quality; (4) prepare local volume tables by
combined-variable or other technique and check their reliabil-
ity; and, (5) explore use of fire in management for: reducing
fire hazard, retarding undesirable woody vegetation, and im-
proving the site.

For. 140

N. C. Growth, Yield, and Volume Determinations in the Pond Pine
Type. (1) Prepare suitable and reliable cu. and bd. ft. volume
tables and yield tables for pond pine; (2) develop a satisfactory
continuous inventory system for pond pine type; (3) establish a
series of permanent sample plots designed to measure effect of
drainage, and learn if on such plots two-way growth projection
provides as reliable a growth project as can be obtained from
permanent plot remeasurements.

For. 141

- N. C. Management Systems for Pine or Hardwood. Learn costs and returns from (1) managing pine stands on even-aged, uneven-aged basis, and unit area basis of management; (2) methods of complete conversion of existing mixed stands to pure pine, partial conversion to pine, and by general improvement of existing stands without any major conversion.
For. 142
- Oreg. Comparison of Willamette Valley Foothill Lands for Use as Farm Forestry or Pasture. To obtain (1) physical and economic data for recommendations of best use of Willamette Valley hill lands for pasture or forestry, and (2) basic ecological data on effect of partial removal of tree growth vs. no treatment.
Anim. Husb., For. 160-7
- Oreg. Forest Soil-Site Relationships. (1. Soil Moisture and Temperature Relations on Cutover Forest Lands in Western Oregon as Affected by Plant Succession, 2. Soil Moisture and Temperature Properties of Pumice Soils of the Central Oregon Pine Region.) To (1) determine soil moisture and temperature relations on forest lands immediately after clear cutting and slash burning; (2) determine influence of plant succession on these soil moisture and temperature relations; (3) ascertain periods during plant succession when soil moisture and temperature conditions are most favorable for the establishment of tree seedlings; (4) learn the basic soil moisture characteristics of pumice soils; and, (5) learn the trends of soil moisture and temperature conditions on pumice soils under different types of vegetative and surface cover conditions.
Soils 165
- Pa. Forest Cutting Practices Affecting Deer Foods. To determine quantity of deer browse produced by silvicultural cutting practices.
For., Zool., Ent. 1057
- R. I. The Study of Existing Rhode Island Forest Types in Relation to Their Rehabilitation by Silvicultural Techniques and Planting. Study existing forest tree types and associations and attempt to correlate these with site conditions, study rehabilitating burned forests, and determine effective and economically feasible ways of growing conifers on said lands.
For. 951
- S. Dak. The Effect of Spacing on the Survival, Growth and Effectiveness of Windbreaks and Shelterbelts in South Dakota. To determine (1) spacing distance that best promotes tree survival, growth and longevity; (2) effect of spacing on soil moisture and nutrient supply in windbreak; (3) influence of spacing on wind reduction and snow accumulation patterns; and, (4) cost of establishment and maintenance of each spacing design as a guide to finding an economic spacing consistent with maximum protection benefits.
Hort. 239

- Tenn. Forest Management. Objectives are: 1. improvement cuttings; 2. fire protection; 3. secure maximum production through weeding practices; and, 4. economic returns for management practices as they apply to individual farms in Cumberland Mountain Area.
For. 102 Coop. TVA
- Tenn. Chemical Debarking of Post-Size Hardwood Trees. (1) Learn optimum date for applying sodium arsenite to freshly girdled hardwoods so as to get fastest debarking; and, (2) treat posts from these trees by cold soaking in a preservative and compare to similar species peeled by hand or a chain peeler.
For. 104
- Tenn. Stand Conversion Study. Convert poor quality hardwood stands on poor sites to more profitable pine production.
For. 105 Coop. TVA
- Vt. Factors Affecting the Periodic Sap Flow in Sugar Maple. Make studies responsible for maple sap flow as: histological, biochemical and physiological studies; (2) evaluate role of environmental factors affecting sap flow mechanism; (3) effect of genetical differences and tissue interaction on sap flow mechanism.
Bot. 40
- Vt. Factors Influencing the Growth and Yield of Sugar Maple Trees. (1) Evaluate producing trees as to sap quality and yield and develop methods for selecting high-yielding specimens; (2) survey variability in young maples and study its relation to adult performance in stocks of known and unknown genetical composition; (3) evolve sugarbush management practices for cut-over areas and abandoned fields, already supporting stands of young trees; and, (5) study role of climatic conditions in influencing productivity.
Bot. 41
- Vt. Site-Tree Relationship as a Basis for Tree Selection for Higher Yields. To learn (1) soil types and forest sites in relation to rate of growth and tree form of principal timber producing tree species in state; (2) principal native timber producing tree species having best growth and tree form for various forest site conditions; and, (3) for principal native timber trees showing superior growth quality, the characteristics distinguishing individual trees to be favored, in application of forest management practices, for high timber production.
For. 47 (NE-27) Coop. SCS

- Vt. Classification of Coniferous Forest Tree Planting Sites Based Upon Soil and Physiography. To develop a classification of potential productivity of coniferous forest planting sites in Vermont based on an analysis of soil and physiographic conditions which exist in established plantations.
For. 50 Coop. SCS
- Vt. Thinnings and Related Silvicultural Practices in the Development of Management Plans for Natural Seeded and Planted Coniferous Forests on Sandy Soils in the Champlain Valley. Learn (1) adaptability of exotic coniferous species in contrast to native species for planting on sandy soils not suited for agriculture; (2) most desirable management practices of establishment, thinning, pruning, improvement cuttings and pest control for native and exotic species; and, (3) changes in physical factors of site as planted and seeded areas develop from open field to closed stand; effect of management practices on site factors; and, physiological response of trees thereto as expressed in quality and quantity of lumber produced.
For. 52
- Wash. The Nature of Resistance to Fluoride Fumigation Found Among Ponderosa Pine, Prunes, Apricots and Gladiolus. (1) Correlate stomatal numbers, size, and position with reaction of Pinus ponderosa, Prunus armeniaca, Prunus domestica, and Gladiolus plants to fluoride fumigation; (2) correlate cutical thickness, epidermal thickness and other morphological features of given plants with reaction of those plants by hydrogen fluoride; and, (3) learn influence of 30 species of Prunus rootstock on response of four commercial prune varieties and four commercial apricot varieties to fluoride fumigation.
Pl. Path. 1322 (W-39)
- W. Va. Efficient Forest Management Practices for West Virginia Cut-Over and Burned Over Hardwood Forest Lands. To determine (1) most effective and profitable silvicultural systems; (2) differences between liquidation cuttings and frequent fires and economic cutting practices and fire protection; and, (3) costs and returns of various thinning, improvement, and harvesting operations.
For. 36
- W. Va. A Survey of Multiflora Rose Plantings in West Virginia, with Special Reference to Growth Characteristics and Spreading Tendencies. To (1) determine rate of growth which occurs under various site conditions and treatment, with multiflora rose planted in West Virginia; (2) collect all available data on values and effectiveness of multiflora rose as a living fence and as wildlife cover and food; (3) secure information on objectionable characteristics of multiflora rose, particularly spreading and becoming a noxious weed; and, (4) assemble data as a basis for setting up experimental plots on which research can be handled under controlled conditions.
For. 42 Coop. SCS

W. Va. Timber Management for the Market Demands in Southern West Virginia Forests. To determine timber product goals for southern West Virginia hardwood forest types; and to devise and test systems of management capable of producing desired timber and suited to needs of forest owners.

For. 56

Disease Control

Conn. Dutch Elm Disease and Its Chemotherapy. (1) Learn causes of dysfunction in wilt diseases; (2) search for compounds to inhibit processes leading to dysfunction or kill the causal fungus; (3) apply promising treatments to plants and measure their translocatability; and, (4) test promising compounds for their efficacy in controlling Dutch elm disease.

Pl. Path., Bot. 652 (NE-25)

Del. Dieback Disease of Oak and Some Diseases of Nursery Seedlings. To determine the etiology, epiphytology, and control of (1) the "dieback" disease of oaks; and, (2) the damping-off, root rot, and needle blight diseases in the conifer seedbed.

Pl. Path. 57-P

Ill. Application of Measures for the Control of Oak Wilt in an Intensively Managed Forest. To test and demonstrate control measures through intensive application and careful observation in a forest where oak wilt has been prevalent for many years.

For. 55-351 (NC-22)

Ind. A Determination of the Distribution, Rate of Spread, and Control of the Oak Wilt Disease in Indiana. (1) Learn prevalence and rate of spread of oak wilt in state; (2) by laboratory methods verify presence of causal fungus in trees suspected of having oak wilt; and, (3) initiate control procedures in important oak timber areas in which disease is prevalent.

Bot., Pl. Path. 905 (NC-22)

Mass. The Nature and Development of Tree Wilt Diseases. To learn: (1-4) pectic enzymes produced by Graphium ulmi and their role in disease production; identity and pathogenicity of various fungi and bacteria isolated from twigs of wilted trees; effect of weather on tree wilt disease; distribution of the A and B strains of Graphium ulmi; and, (5) develop a technique for learning degree of resistance of a tree to a wilt without killing the tree.

Shade Tree Lab. 110 (NE-25)

- Minn. Cause and Control of Biological and Chemical Deterioration of Agricultural Products in Storage. III. Lumber and Other Wood Products. To determine prevalence and cause of discoloration of aspen wood, and to devise methods of prevention and control.
Pl. Path., Bot. 2220-3
- Minn. Epidemiology of Oak Wilt. To (1) study factors affecting formation and life span of mycelial mats; (2) investigate life cycle of oak wilt fungus, particularly production of inoculum; (3) find how this fungus can spread from tree to tree other than by root grafts; and, (4) develop control measures based primarily on eliminating spores as a primary source of inoculum.
Pl. Path., Bot. 2224 (NC-22) Coop. USDA
- Mo. Investigations on Oak Wilt. Study (1) distribution of disease in state; (2) plants affected and varietal susceptibility; (3) morphology, physiology, and pathogenicity of organism; (4) mode of infection, growth of fungus in suspect, emergence of fungus from disease trees, dissemination, seasonal development, influence of environmental factors; (5) movements between hosts other than through root grafts, role of insects and other vectors; (6) sanitation and/or isolation (effect on local spread and effect on long distance spread), vector control, resistance (selection and/or development of resistant varieties).
For. 52 (NC-22) Coop. USDA
- N. J. Symptoms, Spread, and Control of Canker Stain of Plane Trees. To gain on a regional basis and especially in New Jersey, information concerning symptoms and rapid method of diagnosis, relationship of borers to spread, life history of causal fungus, and means of control.
Pl. Path., Ent. 481 (NE-25)
- N. Y. Antibiotics and Related Substances for Dutch Elm Disease
(Cornell) Control. Develop antibiotics or related materials for protecting elms against infection by the Dutch elm disease and to cure those infected.
Pl. Path., Bot. 187 (NE-25)
- Ohio Pathological Aspects of the Oak Wilt Disease. To (1) determine, if possible, the existence of Chalara quercina in fresh cut oak lumber, including white oak group and red-black oak group; (2) place logs and lumber under as many favorable conditions for the growth of Chalara and determine how long the fungus lives in cut logs and lumber; (3) determine whether the saw or any type of cutting machinery spreads the oak wilt fungus, and also whether the saw might carry the fungus into the lumber from healthy trees; (4) determine if there are any methods by which lumber is piled that might keep the oak wilt fungus alive; and, (5) test a series of treatments if the oak wilt fungus remains alive under any condition.
Bot. 96-1 (NC-22)

Ohio

A Study of Possible Vectors of the Oak Wilt Disease Organism. To (1) ascertain the species of insects, if any, that are attracted to Chalara mats; (2) if suspected vectors are found, determine if they carry the oak wilt organism either within or upon their bodies; and, (3) find if they can transmit the organisms to healthy oaks.

Ent. 96-3 (NC-22)

R. I.

Study of the Mechanism of Symptom Development and Chemotherapy of Wilt Diseases, Particularly the Dutch Elm Disease. To (1) determine exoenzyme and hormone production by wilt pathogens in culture; (2) determine effect of these metabolites on host plants; and, (3) evaluate chemicals which may serve as internal medicants.

Pl. Path. 602

R. I.

Abnormal Physiology and Control of Vascular Wilt Diseases of Trees. To learn (1) mechanisms of wilt induction by fungi in trees, investigations of enzymatic auxin and toxin activity in vivo and in vitro; (2) how metabolic poise, carbohydrate level, and air-moisture content of stem tissues may effect severity of symptom development; (3) through field chemotherapeutants (internal-acting medicants) selected by laboratory bioassay.

Pl. Path., Ent., For. 611 (NE-25) Coop. ARS

Wash.

Symptoms and Effects of Fluoride Fumigation on Various Ornamental and Crop Plants. To learn (1) and record photographically the sensitivity of forest, ornamental, vegetable, and agronomic plants to small quantities of atmospheric fluoride; (2) effects of exposure-period on plant response to small amounts of atmospheric fluoride; (3) rate and extent of fluoride up-build in plants exposed to fluoride-contaminated air; (4) fluoride content of forest, horticultural, and agronomic plants grown in Spokane area; and, (5) by terminal and/or radial growth studies if any common fruit or ornamental tree species in Spokane area have been adversely affected by fluoride from local industrial operations.

Pl. Path. 1143 (W-39)

W. Va.

Decay as a Factor in Sprout Reproduction of Yellow Poplar. To determine prevalence and severity of decay as a factor in sprout reproduction of yellow poplar, to learn the organisms chiefly involved, their mode of entrance and rate and nature of decay development, and as a result of this work, to be able to recommend silvicultural treatments which will reduce to a minimum the incidence of decay.

Pl. Path., For. 14

W. Va. Biology and Control of Tree-Wilt Pathogens. (1) Make comparative physiological, morphological, and life history studies of oak wilt pathogen and other fungi causing vascular wilts of trees; (2) learn different methods of spread of oak wilt and similar wilt diseases and evaluate relative importance of each method; (3) devise more effective and more practical methods of control for wilt diseases using information obtained under objectives 1 and 2.

Pl. Path., Bact., Ent. 57 (NE-25)

W. Va. The Possible Relationship of Metallic Ion Toxicity to Drought Injury in Shade and Forest Trees. Learn (1) identity and concentration of metallic ions associated with injury; (2) types of injury with which presence of high concentrations of potentially toxic ions are associated as stem cankers, pimple-type bark swelling, die-back of stems and roots, etc.; (3) species of shade and forest trees found affected: oaks, black cherry, maple, yellow poplar, and others; (4) geographical distribution pattern of types of drought injury related to high concentrations of toxic ions; (5) point of origin and nature of initial injury to tissues of affected trees and response of adjacent tissues to near presence of injury; and, (6) ways in which injury may be artificially induced under controlled conditions.

Pl. Path., Bact., Ent., For. 109

W. Va. The Cause and Control of "Hemlock Canker". (1) Identify pathogen or other cause of disease; (2) if disease is caused by a parasite organism, learn host-parasite relationships including conditions required for infection, disease development, reproduction and dissemination of pathogen; (3) test various control measures applicable to control of disease; and, (4) learn distribution of disease in State.

Pl. Path., Bact., Ent. 113

Wis.

The Spread and Control of Oak Wilt. To further the understanding of the oak wilt disease, how the fungus operates, its spread, and its control by continuing current investigations, including: 1. local spread--to clarify further tree-to-tree spread in local areas, emphasizing role of root-grafting in woodland stands of different age, composition, and density on different sites, and at different times of the year, and to determine significance of "adopted" root systems to maintenance of disease "reservoirs", to disease spread, to survival and growth rate in pure vs. mixed stands, to continuance of dominance or suppression, and to certain practices; 2. local control--to improve and extend methods of local control, emphasizing use of improved chemicals and more efficient root cutters under different circumstances; 3. long-distance spread--to enlarge studies on possible vectors of long-distance spread, stressing role of woodpeckers and squirrels; and, 4. host-parasite relationships--to determine factors both in culture and in the tree which influence the growth, viability, and longevity of various fungus forms; to clarify further wilt mechanisms and host response to fungus infection; and explain variations in these responses.

Pl. Path. 895 (NC-22)

Insect Control

Ala.

Biology and Control of Certain Insect Pests of Forests in Alabama. (1) Study and evaluate damage caused by more important forest insects in State; (2) study certain phases of life histories and habits of important bark beetles and of pests of nurseries and seedlings; and, (3) learn most practical method of controlling major insect pests of forest nurseries and established stands of seedlings.

Zool., Ent. 111 (S-36) Coop. FS

Conn.

Larval Migration and Defoliation by the Gypsy Moth. Learn critical environmental factors affecting gypsy moth larval migrations and how these migrations are related to differences in defoliation damage of resistant and susceptible forest sites.

Ent. 314

Conn.

The Control of Vectors of Dutch Elm Disease. Improve efficiency of control of vectors of Dutch elm disease by development of more effective insecticides for application to (a) trees to be protected and, (b) trees breeding vectors.

Ent., Pl. Path. 317

Del.

Improvement of Measures for Control of Insects Attacking Farm Woodlands and Nurseries. (1) Devise practicable ways for detecting presence, and for recording relative abundance of insect and allied pests damaging farm woodlands; and, (2) learn effect of various ecological factors that might decrease or increase populations of any particular species.

Ent. 3-E

Maine

Wood Borers in Forest Products. To (1) determine species of borers in damaging cut logs and other forest products, and relative importance of species found; and, (2) work out life cycles and habits, for Maine, of species found to be most destructive, and use acquired knowledge of life cycles as basis for research tests to develop effective controls for wood borers in Maine.

Ent., For. 79

Mass.

Insects Concerned in the Dispersal of Dutch Elm Disease, With Special Reference to the Native (American) Elm Bark Beetle, Hylurgopinus Rufipes (Eich.). To (1) study habits and distribution of Hylurgopinus rufipes (Eich), Scolytus multistriatus Marsham, and other insects which may be vectors of Dutch elm disease fungus, Ceratostomella ulmi (Schwarz) Buisman, especially correlation between timing of their feeding habits and seasonal development of host trees when fungus invasion is most likely, so insecticides may be applied at most appropriate time; (2) test new insecticides for elm bark beetle control; (3) experiment with hydraulic sprayers and mist blowers and, when possible, helicopters and other new spraying equipment to learn effectiveness in covering tall trees with insecticides; (4) study effectiveness of most promising insecticides and spraying equipment in actually preventing elm trees from becoming infected with Dutch elm disease fungus over a period of five to ten years; and, (5) when necessary, and in cooperation with other departments, study toxicity to cattle of any insecticide that seems imminent of adoption by the public for Dutch elm disease control.

Ent. 53

Mass.

Materials and Methods Which Promise Value in Control of Insects and Mites on Ornamental Shrubs and Shade and Forest Trees. Study value of newer insecticides and miticides, and applications for control of insects and mites on ornamentals and forest trees.

Ent. 56

Mass.

Use of Insecticides to Prevent Borer Damage to Unseasoned Logs. Learn effectiveness of various insecticides and methods of application in preventing damage by wood boring insects to unseasoned logs and lumber.

Ent. 59

Mass.

A Method to Minimize the Adverse Effect Upon Tree Form of Attack by the White Pine Weevil. To compare (1) removal of all but one lateral branch in second-from-the-top whorl of branches with (2) retention of all laterals in this same whorl to learn effect of treatment (1) on subsequent development and straightness of a substitute main leader to take place of normal leader destroyed artificially to simulate attack by white pine weevil.

For. 74

- Mich. A Determination of the Possibility of Controlling Certain Economic Insects by the Application of Chemicals Upon or Near the Soil Surface. To devise methods of more certain and cheaper controls for some of the insects of fruit forest nursery and nursery crops in general by determination of effect of various insecticides on or near the ground surface on insects spending a part of their life cycle upon or in the soil.
Ent. 28
- Minn. Insect Pests for Forest and Shade Trees. -- A. Forest Management in Relation to Insect Pests of Plantation. -- B. Epidemiology and Control of Insect Outbreaks in Forests and on Shade Trees. -- C. Minnesota Forest Insect Survey. To (1) facilitate prediction of tree insect outbreaks before they develop to the point where it is too late to attempt control; (2) provide basic understanding of natural control agencies operating to terminate outbreaks and sometimes prevent them; (3) develop forest management procedures to reduce or eliminate losses resulting from insect damage; and, (4) explore field of chemical control, both means of applying poisons to trees and use of newly developed insecticides.
Ent., Econ., Zool. 1706
- Miss. Biology and Control of Certain Insects Affecting Forest Trees and Unfinished Forest Products in Mississippi. (1) Evaluate damage caused by insects previously listed; (2) study life histories and habits of insects listed; (3) effect of environmental factors on biology and damage caused by insects; and, (4) develop control measures for these species applicable to nurseries, forests, woodlots, and unfinished wood products.
Zool., Ent. HH-2, RRFH2 (S-36) Coop. FS
- Mo. Taxonomy and Biology of Insects Attacking Acorns in Missouri. (1) Conduct systematic study of insects attacking acorns with emphasis on various species of nut curculios; and, (2) investigate biology and ecology of insects attacking acorns.
Ent. 294
- Mo. The Biology and Control of Carpenterworms and Associated Borers in Missouri. Study the biology, taxonomy, ecology, and control of carpenterworms and associated borers and evaluate their importance as enemies of hardwoods.
Ent. 321
- P. R. Chemical Characterization of the Termite-Repellent Substance in West Indian Mahogany Wood (Swietenia Mahagoni). To characterize chemically the substance responsible for termite-repellent activity of mahogany wood.
Nutr., Ent., Biochem., Med. 83

W. Va.

Biology and Control of Nematodes Affecting Fruit Trees and Forest Tree Seedlings. (1) Learn effect of nematodes on growth and productivity of young fruit trees; nature of parasitism of ecto-parasitic nematodes on roots; deciduous fruit tree host range of parasitic nematodes found in state, and suitable nurse crop for rearing cultures of nematodes; measures suitable for commercial control of nematodes on young trees; extent that toxic materials are absorbed and translocated and if this causes off-flavor; (2) learn role of nematodes in lack of productivity and early decline of established plantings of fruit trees, and failure of replant trees to thrive; occurrence and relative importance of nematodes in commercial orchards in state; effective control measures of nematodes in declining orchards, and how they affect replant trees in established orchards, learn extent that toxic materials are accumulated and translocated within mature fruit trees, and if this causes off-flavor; and, (3) learn identity of nematodes and associated diseases on productivity of forest and shade tree nurseries; specific identity of nematodes and their role in root disease complex on nursery stock; cultural and chemical control practices that increase or decrease incidence and severity of nematodes and nematode-disease complexes.

Pl. Path., Bact., Ent. 72 (NE-34)

Lumbering

Ind.

Economic Maturity for Some Indiana Hardwoods. To learn (1) relative importance of various indicators of tree vigor and to define vigor classes for Indiana hardwood species; and, (2) by species, tree grade, and vigor classes, the size at which hardwoods cease to earn a given rate of interest.

For. and Conserv. 891

Mo.

Decay and Defect in Missouri Trees. To give foresters information on amount of decay commonly associated with external tree defects and on rapidity of spread of decay.

For. 75-F

N. Y.

The Adaptation and Development of Farm Equipment for the Efficient Handling and Processing of Diverse Products from the Farm Woodlot. To (1) promote sound woodlot management for more New York state farm woodlots; (2) increase cash income from farm woodlot; (3) enable farmer to harvest his woodlot crop with minimum of effort and time and with existing or adapted farm equipment; (4) provide more of farm's need of fiber and organic matter for litter, bedding, and soil humus; (5) up-grade woodlot products by farm processing to create a more salable product with greater value; (6) provide higher standard of living for "hill" farmers; and, (7) provide easily handled, cheap fuel in areas where oil and coal are high.

Agr. Engin., Agron., Anim. Husb. 34

Economics and Marketing

- Ala. Improving the Marketability of Southern Wood. Increase margin available to manufacturer of wood products by increasing use and value of products to consumer by: evaluating properties giving most to quality and value; developing new sizes, shapes, or forms for better use and marketability; making wood properties better competitor with other materials; improving fabrication for more efficient engineering designs.
For., Agr. Econ. 564
- Calif. Marketing Practices and Other Price Determining Factors for Logs and Stumpage. (1) Identify, describe, and analyze factors influencing prices of logs and of stumpage in a particular forest area; (2) identify: principal buyers of these products in area, the market areas of individual buyers, and factors determining market areas; (3) identify sellers of products in area, sources of market contacts available to sellers, and factors determining selection among market contacts; (4) analyze changes of last five years in market forces, characteristics, and influences identified; (5) develop a concept of market applicable to observed conditions, establish criteria for delineation of market areas, and define market area of which study area is a part; and, (6) learn possibility and usefulness of establishing an organized market information service for logs and stumpage under conditions of marketing and price determination.
For. 1711 (WM-31)
- Colo. Marketing of Forest Products in Colorado. To learn (1) consumption of various types of forest products in state; (2) future consumption of types of forest products now in use, based on population gains and industrial development expected from present trends; (3) possibilities for increased use of wood grown in state to supply existing demands through improved manufacturing and marketing; (4) opportunities for development of new uses for state grown woods, especially species now used under growth capacity; (5) extent of influence of marketing practices on management of private owners; and, (6) extent of influence of marketing and processing practices on consumers and processors.
For. 71 Coop. FS
- Colo. Price-Determining Factors and Marketing Practices for Sawtimber Stumpage of Private Timberland Owners in Colorado. (1) Describe marketing system for stumpage with reference to: Availability of markets and prices, types of buyers and transaction; (2) analyze pricing system as to existing competition, variations in prices, factors affecting prices of logs and stumpage; and, (3) evaluate effectiveness of various marketing practices on income received by timber owners, and develop procedures for improving market and pricing systems.
For. 239 (WM-31) Coop. ARS

Idaho

Marketing Practices and Price Analysis of Idaho Non-Industrial Logs and Stumpage. (1) Describe marketing system for logs and stumpage with reference to: availability, stability, and location of markets, type of buyers and transaction; (2) analyze pricing system with emphasis on existing competition and factors affecting prices; (3) evaluate effectiveness of various marketing practices on income of timber owners, and provide a basis for improving market and pricing systems.

Agr. Econ., For. 311 (WM-31) Coop. FS

Ind.

Production and Marketing Studies for Small-Sawmill Products. To learn (1) production and marketing practices of small sawmill industry; and (2) influence of various marketing practices on use of certain species and qualities of timber.

For. and Conserv. 704

Ind.

Marketing Christmas Trees and Christmas Greens in Indiana. To (1) determine volume by species and source of Christmas trees and greens marketed in the state annually; (2) evaluate methods used for marketing native grown Christmas trees and greens and comparative advantages and disadvantages of various methods; and, (3) determine potentialities of Christmas tree and greens market.

For. and Conserv. 766 (NCM-20)

Ind.

A Descriptive Study of the Markets and Marketing Services Available to the Woodland Owners of Indiana. To determine (1) markets existing for woodland products and the needs of these markets with respect to form of product and volume purchased annually by species and quality; (2) extent and frequency of product specification changes in primary wood-using industries; and, (3) ways of sampling industry and specifications changes usable by extension foresters of the state.

For. 800

Ind.

Harvesting and Marketing Hickory in Indiana. Learn (1) state industries using hickory; form, quality, and volume of products used; source of supplies and prices paid; (2) costs of cutting, yarding, and hauling of primary products.

For. and Conserv. 825

Iowa

Secondary Markets for Wood in Iowa. To (1) investigate secondary wood-using industries of Iowa particularly as a market for primary wood producers; (2) investigate and learn feasibility of marketing products manufactured from low grade forest crops, woods, and mill waste for which a fully developed system of marketing channels is not now in existence; (3) bring up to date a directory, Wood Using Industries of Iowa; and, (4) learn economic feasibility of establishing concentration yards between the primary and secondary manufacturers.

Agr. Econ., For. ES 454

Maine

Marketing Forest Products in Maine. To determine (1) marketing agencies, practices, and facilities in the State, particularly pricing process at farm level; (2) adequacy of marketing facilities, their effectiveness in channeling products to the most practicable use; and, (3) adequacy of available forest marketing statistics and services both public and private.

For. 30 (NEM-6)

Md.

Marketing Maryland Forest Products. To determine (1) and describe present marketing agencies, practices, and facilities in Maryland; (2) adequacy of marketing facilities and market outlets, and their effectiveness in channeling products to their most effective use; (3) adequacy of available forest marketing statistics and services; and, (4) need for, and feasibility of organizing cooperatives for marketing woodland products.

Agr. Econ. A-26-ah (NEM-6)

Mass.

Marketing Forest Products in Massachusetts. (1) To appraise adequacy of market facilities from standpoint of forest resources, and appraise effectiveness of marketing information in channeling products from small area woodland ownership to their most practicable use; and, (2) learn adequacy of available forest market statistics and services both private and public.

For., Agr. Econ. 123 (NEM-6)

Minn.

Improving and Increasing the Utilization and Marketing of Minnesota Hardwoods. -- 1. The Utilization and Marketing of Low-Quality Aspen. 2. The Utilization and Marketing of Paper Birch. 3. The Utilization and Marketing of Other Hardwoods. To (1) increase present outlets for Minnesota hardwoods through product improvement and marketing studies; (2) develop new uses and outlets for Minnesota hardwoods; and, (3) obtain additional substitution of Minnesota hardwoods for our valuable and increasingly scarce conifers such as spruce and pine.

For. 1911

Minn.

Marketing Practices and Price Formation in North Central Farm Woodland Product Sales. (1) Learn practices and price-making methods involved in sale of farm woodland products by farmers and first buyers; (2) establish practice-method classes on basis of patterns of practices and methods resulting from transactions of sellers and buyers classified in terms of local market structure and other economically relevant characteristics; (3) learn probable reasons for major differences in practices and methods among practice-method classes; (4) compare existing practices and methods within major classes to standards of practices and methods for each class which appear realistically attainable on basis of best individual past marketing practices found; and, (5) recommend corrective measures tending to bring actual practices into conformance with marketing conditions established as reasonable standards in (4) above.

For. 1921 (NCM-17)

- Miss. Pulpwood Marketing in North Mississippi. To learn (1) present marketing facilities and practices in North Mississippi; and, (2) evaluate factors which contribute to unstable and sporadic nature of the market in North Mississippi.
For. HI-3
- Miss. The Market Potential for Christmas Trees Grown in Mississippi. (1) Learn market potential for state grown Christmas trees; and, (2) compare prices for Mississippi grown trees to those grown in other areas.
For. HI-4
- Mo. Marketing the Timber Crop. a. Preservation of Posts and Farm Timber. b. Effect of Lumber Grading on Sale Values of Lumber.
For. 120
- Mo. Marketing the Timber Crop. -- b. Effect of Lumber Grading on Sale Value of Lumber. To (1) determine if sorting and selling sawed lumber by grade results in increased income to the small sawmill operator over selling on a mill-run basis; (2) determine reasons why lumber grading is not practiced by most sawmill operators at present; and, (3) study nature and variations in grade-price differentials which may exist at selected local markets.
For. 120-b
- Mo. Economics of Timber Production. To determine factors of cost in the production of timber, and the net income which is derived from timber under different types of management, specifically: case studies of income from producing timber, growth and yield studies; taxation of forest land, and forest site evaluation.
For. 124
- Mo. Marketing Christmas Trees. To determine (1) size of Missouri market for trees and evergreen boughs and ascertain general problems and trends characterizing the industry; (2) consumer preferences with respect to species, size and grade of tree and consumer habits in use of trees and evergreen boughs; (3) retail level of industry, the present sources of supply and their reliability in terms of quantity and quality, the calendar period, size and nature of individual operations, and basis for pricing; (4) methods of operation, sources of supply and problems of wholesalers; (5) marketing methods used and problems of growers; and, (6) develop improved methods of marketing trees and boughs.
For. 245 (NCM-20)

- Mo. Marketing and Processing of Hardwood Panelling. To determine (1) consumer preference for different grades, sizes and finishes of panels; (2) effects of different finishing materials and methods of applying these materials on appearance of panels; (3) effectiveness of different types of fasteners for holding panels in place; (4) best methods of manufacturing panelling; and, (5) cost of producing panelling.
For. 259 (NCM-17)
- Nebr. Marketing Methods and Consumer Preferences for Christmas Trees and Greens. Make survey of marketing methods and trade and consumer preferences for trees and greens in State as a source of information for NCM-20 and for growers, tradesmen, and consumers by learning: consumer preferences as to size, species, and other characteristics; volume, by species and source, of trees and greens marketed in State; reaction of dealers to locally grown trees compared to imported ones; present method of sales--wholesale and retail--including sources, transportation methods, contracts, markups, and surpluses.
Hort., Agr. Econ. 551 (NCM-20)
- N. H. Marketing Forest Products in New Hampshire. To learn (1) and describe present marketing agencies, practices, and facilities in the State, including particularly pricing policies at farm level; (2) adequacy of marketing facilities from standpoint of forest resources and effectiveness of channeling products to most practicable use; and, (3) adequacy of forest marketing statistics and services, both public and private.
For. 82 (NEM-6) Coop. FS
- N. J. Marketing Forest Products in New Jersey. To determine (1) and describe present marketing agencies, practices, and facilities in the region, particularly treatment of pricing process at farm level; (2) adequacy of marketing facilities from standpoint of forest resources, and effectiveness in channeling products to most practicable use; and, (3) adequacy of available forest marketing statistics and services both public and private.
For. 304 (NEM-6)
- Ohio The Market for and Marketing of Ohio Grown Christmas Trees. To learn (1) potential market for Ohio grown Christmas trees; (2) outlets used by Ohio growers, including prices received compared to prices received for trees imported into state; (3) reaction of dealers to Ohio grown trees compared to imported trees; (4) desirable size, species, and other characteristics as reflected by dealers; (5) regionality of demand of species of Ohio grown trees; (6) approximate number of Ohio grown trees marketed at present; (7) number being grown at present; (8) possible markets for boughs; (9) market potentialities for potted trees; (10) present mode of sale; and, (11) methods and cost of transportation.
Agr. Econ., For. 146 (NCM-20)

- Oreg. Marketing Practices and Prices for Timber Products from Farms and Small Private Holdings in Western Oregon. To learn (1) structure, organization, and stability of markets for timber products sold by farmers and other small forest owners, and to evaluate the marketing practices and degree of competition in markets; (2) effect of above market factors on timber prices; (3) sales arrangement which will minimize returns to timber owner under given conditions, and which will increase contribution of timberlands to regional economy.
For., Agr. Econ. 306 (WM-31) Coop. FS
- Pa. Marketing Forest Products in Pennsylvania. To (1) investigate present marketing agencies, practices, and facilities in Pennsylvania, and determine pricing processes at farm level; (2) appraise marketing facilities from standpoint of maintaining and improving forest resources, and effect in channeling products to most practicable use; and, (3) determine available public and private forest marketing statistics and services.
For., Agr. Econ., Rur. Sociol. 1161 (NEM-6)
- Pa. Marketing Christmas Trees. To determine and evaluate marketing practices for Christmas trees, including: 1. supplies by age and species, 2. marketing practices including time and method of harvesting, preparation for market, and storage and transportation; 3. type of buyer and sale contract, 4. markets for Pennsylvania Christmas trees, 5. prices received for trees by markets and species, and 6. evaluation of effect of alternative marketing practices.
For., Agr. Econ., Rur. Sociol. 1228
- Tenn. Marketing Forest Products. -- Practices of First Buyers and Producers of Forest Products in Tennessee. Describe marketing system and practices for forest products; determine how effectively forest marketing needs of producers being met; investigate ways of improving forest marketing practices of producers and first buyers if inadequacies in present marketing system become apparent.
Agr. Econ., Rur. Sociol. 16
- Vt. Marketing Forest Products in Vermont. To determine (1) present marketing agencies, practices, and facilities for forest products from small woodland areas in Vermont, including particularly a treatment of pricing process at farm level; (2) adequacy of marketing facilities from standpoint of forest resources, and effectiveness in channeling products to their most practicable use; and, (3) adequacy of available forest marketing statistics and services both public and private.
For. 51 (NEM-6)
- Wash. Improving the Market of Washington Farm Woodlot Products. To determine most profitable alternatives of where and how to market farm woodlot products.
For., Agr. Econ. ES 307

W. Va.

Marketing Forest Products in West Virginia. To determine (1) and describe present marketing practices, facilities, and agencies in the state, including pricing process at farm level; (2) effectiveness of marketing facilities in channeling forest products to uses most advantageous to forest landowner from standpoint of good forestry and financial returns; and, (3) adequacy of available forest marketing statistics and services, both public and private.

Agr. Econ., For. 61 (NEM-6)

Utilization

Colo.

Investigations in Wood Utilization, Preservation, Seasoning, and Technology to Induce More Efficient Use of Colorado's Native Woods. To (1) determine utility and durability of local woods for fence posts, structural timbers, boxes and crates, etc.; (2) determine inherent wood characteristics and problems associated with use of native woods which have not been adequately tested; (3) compare effectiveness of different preservatives and treatments designed to prolong service life of native woods used for farm, structural, and other purposes, and to develop new preservatives and treatments where existing ones are unsatisfactory; (4) develop economical seasoning practices for native woods to improve their use; (5) develop improved dimensional sawing techniques; (6) develop new products from and uses for native woods, including woody plants which are undesirable on rangelands and potential farmlands; and, (7) develop new uses, such as mulch, bedding material, stock feed, alcohols, sugars, resins, etc., for by-products of wood utilization industry of value to ranchers, farmers, gardeners, and industrial concerns.

For. 70 Coop. FS

Ill.

The Preservative Treatment of Wood Products for Farm and Home Use. -- A. The Preservative Treatment of Fence Posts (Northern Illinois). B. The Preservative Treatment of Electric Fence Stakes. C. The Preservative Treatment of Fence Posts (Southern Illinois). E. Horizontal Vs. Vertical Treatment of Fence Posts. N. Analyzing the Penetration of Pentachlorophenol Wood Preserving Solutions. O. A Study of Pressure-Treated Millwork. Q. The Preservative Treatment of Greenhouse Duckboards.

For. 55-331

Ill.

Analyzing the Penetration of Pentachlorophenol Wood-Preserving Solutions. To develop a satisfactory qualitative method to determine presence of pentachlorophenol in wood.

For. 55-331N

- Ill. The Effect of Low-Solution Temperatures, Wood-Moisture Content, and Intermittent and Continuous Types of Soaking on the Treatment of Ponderosa Pine. To determine what effect solution temperatures below 80° F., wood-moisture contents below fiber saturation point, and intermittent and continuous soaking periods have on the treatment of ponderosa pine with light-oil and heavy-oil solutions of pentachlorophenol.
For. 55-331 Supplement 1
- Ill. Farm Construction as a Market for Native Timber. To learn (1) methods and channels currently used in marketing native timber for farm construction; (2) specifications and requirements for such timber; (3) extent to which native lumber can be used for farm construction in place of western and southern softwood lumber; (4) prejudices and objections to use of native lumber for farm construction, and how to remedy such; and, (5) possibilities of using recent technological developments as a means of developing new markets or improving existing ones for native lumber for farm construction.
Engin., For. 55-352 (NCM-17)
- Ind. Improvement of Wood Utilization in the Structural Design of Buildings. (1) Design and test new structural elements of nail-glued, bolt-glued, and laminated construction for roof, floor, and wall systems; (2) compare wood structures fastened by various means subject to both static and repeated loads; and, (3) extend development of nail-glued connection completed and study economic aspects of different means of fabrication.
Agr. Engin., For. 672
- Ind. New Methods for Predicting the Strength of Structural Wooden Members. To (1) learn variability of structural wood elements of small size by introducing new methods of instrumentation and more rigorous methods of analysis; (2) examine behavior of full-size hardwood or softwood beams within present stress grades; and, (3) devise non-destructive test system which includes variables other than those evaluated in a visual inspection system.
For. 746
- Ind. Adaptation of Nail-Glued and Bolt-Glued Connections to Farm Buildings. (1) Apply known characteristics of nail-glued and bolt-glued structural elements to improvement of farm buildings by: a. investigating strength and behavior of full-size trusses with spans up to 60'. b. investigating problems in actual construction with such trusses; (2) test full scale rigid frames for building designs; (3) investigate durability of glued structures in farm buildings; (4) learn economics of using nail- and bolt-glued connections in farm buildings; and, (5) learn design procedures for nail- and bolt-glued trusses.
Agr. Engin. 806 (NC-23)

- Ind. The Adaptability of Properly Cured Low-Grade Hardwoods for Structural Fabrication. (1) Evaluate performance of properly prepared problem species lumber with respect to workability using modern fasteners and devices for their application; (2) test efficiency made with same using conventional loading systems with new systems made possible by new hydraulic test facilities under construction at Purdue; and, (3) evaluate properly prepared lumber for component use in structural elements now under study on other Purdue projects.
For. and Conserv. 826
- Iowa Physical Properties of Iowa Hardwoods. Learn (1) relation of occurrence of tension wood and other growth abnormalities to site; (2) effect of tension wood and other growth abnormalities on mechanical and physical properties of wood; (3) correlation of occurrence of tension wood and other growth abnormalities to sawing and seasonal problems; and, (4) study shrinkage of and movement of liquids through native hardwood with the idea of throwing light on seasoning and machining problems.
For. 1330
- La. Preservative Treatment of Louisiana Timber Species for Use in Light Construction. To study (1) relationships between preservative treatments and durability of exterior finishes; (2) relationships between preservative treatments and dimensional stability of wood; (3) effects of preservative treatment on nail-holding ability; and, (4) effects of preservative treatment on service life of wood used in light construction.
For. 904
- Minn. Increasing the Serviceability of Wood and Wood Products on Farms. (1) Reduce construction costs of farm structures made all or in part of wood through use of more effective and economic construction methods and practices; (2) reduce annual cost of wooden farm structures through use of materials treated with wood preservatives; (3) continue studying possibilities of tamarack as a source of treated posts.
For. 1912
- Miss. The Utilization of Farm-Forest Products. To learn (1) effectiveness of various preservatives and methods of treatment in preservation of fence posts on farm; (2) most satisfactory methods of bark removal in terms of economy and of subsequent processing or use, paying particular reference to chemical debarking; and, (3) injurious effect on livestock from using treated lumber in building feed troughs and feed storage units.
For. HI-1

Mo. Marketing the Timber Crop. -- a. Preservation of Posts and Farm Timber. To secure factual data on simple methods of preservation employing methods available to the farmer; this year in particular to bring analysis of data up to date and to prepare a manuscript for publication, as well as to put in additional posts to service tests.

For. 120-a

Mo. Utilization of Native Timber and Residues. To (1) survey wood-using industries in state to learn kind of wood technology problems; (2) study conditioning or treatment of wood by physical or chemical means to improve its value as raw material; (3) study improvement of techniques for fabricating products from wood; (4) develop uses for low-grade wood or wood residues; and, (5) study physical and structural properties of wood.

For. 159

N. H. The Utilization of Products from Chemically Treated Trees. To determine (1) drying rate of wood in standing trees after chemical treatment; (2) effect on cost of product integration of chemically treated trees; and, (3) methods for increasing value of wood products of chemically killed trees, and thereby bring into being a source of income.

For. 89

N. J. A Study of Black Locust and Its Suitability for Fence Posts as Influenced by Spacing, Pruning and Cultural Operations. To establish the proper management procedures for black locust, and investigate its growth and yield, and study performance on land unsuited for farming.

For. 302

N. Y.
(Cornell) The Utilization of Small Trees from the Farm Woodlot and Farm Plantation. To find new uses and more fully explore existing uses for the products which can be made from small trees, in order that the whole farm enterprise may be benefited and the forest thinning operation conducted at a profit.

Agr. Engin., Anim. Husb., Veg. Crops, Flor., Conserv. 83

N. Y.
(Cornell) Maple Products Production. (1) Learn costs of production of various aspects of syrup operation, as relative influence of sap flow per bucket and sugar percentage; how small an operation can be conducted profitably; study syrup quality as influenced by sugar sand, sap sweetness, bacteria, and progress of season; analyze cost of early tapping, reaming, deep tapping, and hanging different numbers of buckets on tree; and, (2) learn effect of crown on sap production and sugar concentration; what type of tree is most desirable and what to aim at in developing a sugar bush, and how best to thin sugar bush.

Conserv. 84

- N. C. The Utilization of Southern Hardwood Residues. Develop procedures for converting residues to commercial products by developing uses for: (1) presently unmerchantable species; (2) wood residues including limbs, tops and long butts; (3) slabs, edgings, trimming, round up, clippings, sawdust, and sanderdust; and, (4) develop rational commodity grades for southern hardwoods (based upon yield).
For. Res. HM-20 Coop. FS
- N. C. Factors Influencing the Quality of Rotary Cut Veneer. Investigate the basic principles underlying the manufacture of high quality veneer, and study influence of the various operating factors on quality of veneer produced by the rotary cutting method.
For. Res. HM-22
- N. C. Gluing Wood Products. Develop more efficient methods of utilizing adhesives in the manufacture of wood products through development of: better adhesive test methods, improved gluing techniques, and better wood-glue aggregates.
For. Res. HM-23
- N. C. The Development of Mathematical Decision Making Techniques for the Wood Industries. Learn how mathematical decision making techniques can be substituted for the conventional empirical methods in the conduct of wood processing operations.
For. Res. HM-24 Coop. FS
- Vt. Utilization, Processing, and Marketing of Small and Inferior Tree Species in the Development of a Management Program to Secure Maximum Stocking and Increment in Small Woodland Areas. Learn (1) species in mixed stands in farm woodlands, adapted to sandy soil, for making most rapid volume growth of high quality wood; (2) best methods of improving above to provide a maximum net annual income per acre by: increasing quality, growth rate, and stocking; (3) home use or marketing forms for trees cut in improvement; (4) by time-cost studies cost of various operations used in objectives 2 and 3; and, (5) most practicable on-the-farm methods of disease and insect control and damaged timber salvage, and make time-cost studies of operations required in development of final crop species.
For. 53 Coop. FS

REGIONAL PROJECTS

NC-22

Investigations on Oak Wilt. To (1) gain, on a region-wide basis, essential information concerning the fungus, Endoconidiophora fagacearum Bretz, causing the oak wilt disease, host range factors responsible for both local and long distance spread, and to determine the vector or vectors; (2) determine the importance of the fungus mat, its role in the spread of the fungus, and the conditions that affect its production; (3) obtain information on the longevity of the fungus under as many conditions as possible and from this determine cultural practices that might influence control procedures, on the effects of the wilt fungus on wood from trees killed by the disease, and on a possible antibiotic relationship of associated wood fungi on the oak wilt organism; (4) formulate control procedures from information obtained from the above objectives. The development of chemical control procedures by spraying, chemotherapeutic treatment, and systemic treatment, woodlot practices by sanitation; (5) ascertain the possibility of resistance within both the white oak and black oak group; and, (6) develop, if possible, silvicultural practices that will allow continuous woodlot production even though the disease is present. Studies on harvesting methods, woodlot care, and the general control measures that could be made to fit such practices.

Cooperating stations and agencies: Federal-grant projects - Ill., Ind., Minn., Mo., Ohio, Wis., I-E, USDA

NC-23

Requirements and Design of Structures and Related Equipment for Unified Farmstead Operations. To (1) establish and conduct investigations in the area of Farm Buildings and Related Equipment sufficient in scope that the various phases of Structural Design, production requirements, environment, materials handling, labor efficiency, and mechanisms may be studied in detail and coordinated into recommendations for efficient Farmstead operations; (2) define the areas of research needed for planning of unified operations within the Farmstead as follows: a. control of environment within structures, b. efficient labor, management, and mechanization for handling, processing, and storing livestock feed, forage, and bedding, and removing manure, c. efficient labor, management and mechanization for animal production and handling, storing, processing, and controlling quality in harvested food crops, and animal products, and d. performance and requirements of structural materials and their application to design in the development of buildings and related equipment; and, (3) initiate specific sub-projects insofar as resources permit, that will outline work planned for the areas of research described under objective (2).

Cooperating stations and agencies: Federal-grant project - Ind., I-I

NCM-17

The Marketing of Farm Woodland Products in the North Central Region. The purpose of this project is to discover new or more profitable markets and uses for all the material now being produced in farm woodlands as a means of increasing farm income and encouraging better woodland management and utilization.

Cooperating stations and agencies: Federal-grant projects - Minn., I-A, Minn., Mo., I-H, Ill., I-I

NCM-20

Marketing Christmas Trees and Greens in the North Central Region. To determine (1) the volume, by species and source, of Christmas trees and greens marketed in the North Central Region; (2) outlets used by local growers, including prices received compared to prices received for trees imported into the region; (3) reaction of dealers to locally grown plantation trees compared to imported trees; (4) consumer preference as to size, species, and other characteristics, and the regionality of such consumer preference; (5) the approximate number of Christmas trees now growing; (6) the present method of sales--wholesale and retail--including sources, transportation methods, contracts, mark-ups, and surpluses; and, (7) to develop grades for trees marketed in the region.

Cooperating stations and agencies: Federal-grant projects - Ind., Mo., Nebr., Ohio, I-H

NE-25

Biology and Control of Wilt Pathogens. This project proposes a comprehensive study of the biology and control of wilt pathogens with major emphasis on oak wilt (Endoconidiophora fagacearum) and the Dutch elm disease (Ceratostomella ulmi).

Cooperating stations and agencies: Federal-grant projects - Conn., Mass., N. J., N. Y. (Cornell), R. I., W. Va., I-E, ARS

NE-27

Forest Tree Improvement and Site Capability Determinations. To (1) determine in forest stands the commercial tree species to be favored in forest management on the basis of soil and site growth capabilities for high increment and quality forest products; (2) consider seed production, sources of seed, and strains of important forest tree species as related to the development of superior stocks for forest plantings and Christmas tree production; and, (3) investigate the frequency and occurrence of haploids in important coniferous species to establish homozygous lines by chromosome doubling for the utilization of homozygous haploids in the production of forest tree seedlings.

Cooperating stations and agencies: Federal-grant projects - Maine, Md., N. H., N. J., Pa., I-B, Mass., N. Y. (Cornell), Vt., I-D, SCS, FS

NE-34

Biology and Control of Nematodes Associated with Plant Diseases. To (1) determine kinds of plant parasitic nematodes present, explore their ecological relationships, and assess damage done by diseases they cause; (2) clarify life histories of important plant pathogenic nematodes, determine the influence of environmental factors on their development and pathogenicity, and clarify relationships between nematodes and other soil organisms in causing plant diseases; (3) make available type materials of pathogenic species for identification purposes; and, (4) devise control measures for important diseases caused entirely by nematodes or the development of which is influenced by nematodes. Host resistance, host culture, antibiosis, and chemical treatment will be given primary consideration.

Cooperating stations and agencies: Federal-grant project - W. Va., I-F

NEM-6

Marketing Forest Products. To determine (1) and describe present marketing agencies, practices, and facilities in the region, including particularly a treatment of the pricing process at the farm level; (2) the adequacy of marketing facilities from the standpoint of forest resources, and their effectiveness in channeling products to their most practicable use; and, (3) the adequacy of available forest marketing statistics and services both public and private.

Cooperating stations and agencies: Federal-grant projects - Md., Mass., N. H., N. J., Pa., Vt., W. Va., I-H, FS

S-23

The Application of Genetics and Cytology to the Improvement of Southern Pines. To determine (1) the range of genetic variabilities in species and races of southern pine and to evaluate the more promising genotypes; (2) the heritability of the economically important morphological, physiological, and anatomical characters of southern pines; (3) the genetical and cytological relationships between the species of southern pine; and, (4) the mode of inheritance of the important economic characters of southern pines.

Cooperating stations and agencies: Federal-grant projects - Ala., Ga., N. C., Tenn., Tex., I-B, La., I-C, FS, Texas Forest Service

S-36

Biology and Control of Certain Insects Affecting Forest Trees and Unfinished Forest Products in the South. To (1) evaluate damage caused by the insects previously listed; (2) study life histories and habits of the insects listed; (3) study the effect of environmental factors on the biology of the insects listed and the damage caused by them; and, (4) develop for these species control measures that are applicable to nurseries, forests, woodlots, and unfinished wood products.

Cooperating stations and agencies: Federal-grant projects - Ala., Miss., I-F, FS

W-39

Effect of Fluorine (as Fluorides) on Plants, Animals, and Soils. To (1) conduct research on the effects (assimilation, physiological reactions, and other metabolic processes) of different levels of fluorides in specified plants and animals; (2) investigate the accumulation of fluorides in soils, their reaction in the soil and their effect upon plants; (3) develop and/or evaluate simplified or other methods for determination of atmospheric fluorides; and, (4) develop techniques for the alleviation of fluoride injury in plants and animals.

Cooperating stations and agencies: Federal-grant projects - Calif., Wash., I-D, Wash., I-E

WM-31

Marketing Practices and Prices for Western Non-Industrial Logs and Stumpage. To (1) describe the marketing system for western logs and stumpage with reference to: a. availability and location of markets, b. stability of markets and prices, and c. type of buyers and transactions; (2) analyze the pricing system of western log and stumpage markets as to: a. existing competition, b. variations in prices, and c. factors affecting prices of logs and stumpage; and, (3) evaluate the effectiveness of various marketing practices on income received by timber owners, and develop procedures for improving market and pricing systems.

Cooperating stations and agencies: Federal-grant projects - Calif., Colo., Idaho, Oreg., I-H, ARS, FS

LIST OF COMPILATIONS OF FEDERAL-GRANT RESEARCH PROJECTS
AT STATE AGRICULTURAL EXPERIMENT STATIONS

ARS-23-8:		
Part :	Subject-Matter Area	Title of Section
Numbers :		
1	Agricultural Chemistry	Agricultural Chemistry
2	Agricultural Economics	a. Prices, Incomes, & General Studies of Com- modities & Industries b. Farm Management c. Land Economics d. Farm Finance & Taxation
3	Agricultural Engineering	a. Land & Water Use & Develop- ment b. Power Machinery & Equipment c. Farm Structures & Materials
4	Animal Husbandry	a. Beef Cattle b. Sheep & Goats c. Swine
5	Dairy Husbandry	Dairy Cattle
6	Dairy Technology	Dairy Technology
7	Entomology & Economic Zoology	a. Field Crop Insects b. Fruit, Nut & Vegetable Insects c. Miscellaneous Insects & Economic Zoology d. Insecticides
8	Field Crops	a. Cereal Crops b. Oil, Fiber, Tobacco & Sugar Crops
9	Food Science & Technology	a. Food Chemistry, Micro- biology, Sanitation & Public Health b. Food Engineering, Processing, Product and Process Develop- ment, Utilization and Waste Disposal c. Food Quality & Standards, Acceptance, Preference, & Marketing
10	Forage Crops, Pastures & Ranges	Forage Crops, Pastures & Ranges
11	Forestry	Forestry

ARS-23-8:

Part :	Subject-Matter Area	Title of Section
Numbers :		

12	Fruits & Nuts	Fruits & Nuts
13	Home Economics	a. Human Nutrition b. Housing c. Clothing & Textiles d. Foods-Consumer Quality & Utilization e. Household Economics & Management
14	Economics of Marketing	a. Field Crops b. Fruits & Vegetables c. Livestock, Meats & Wool d. Dairy Products e. Poultry & Poultry Products f. Forest Products & Ornamental & Drug Plants g. Cross-Commodity & Functional Studies
15	Meteorology	Meteorology
16	Ornamental & Drug Plants	Ornamental & Drug Plants
17	Plant Pathology & Bacteriology	a. Plant Pathology, Botany, & Diseases of Miscellaneous Crops b. Diseases of Field Crops c. Diseases of Fruit Crops d. Diseases of Vegetable Crops
18	Plant Physiology & Nutrition	Plant Physiology & Nutrition
19	Poultry Industry	Poultry Industry
20	Rural Sociology	Rural Life Studies
21	Soils	a. Soil Chemistry & Microbiology b. Soil Fertility, Management & Soil-Plant Relationships c. Soil Physical Properties, Conservation & Classification
22	Vegetables	a. Vegetable Crops b. Potatoes
23	Veterinary Science	Veterinary Science
24	Weeds	Weed Control

